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Peer Review Report

Peer review report 1 On "Delineating groundwater/surface water interaction in a karst watershed: Lower Flint River Basin, southwestern Georgia, USA"

1. Original Submission

1.1. Recommendation

Minor Revision

2. Comments to Author

This manuscript combines chemical and isotopic analyses of stream water, groundwater, precipitation, and pond water to examine spatial and temporal variability in discharge along Ichawaynochaway Creek in southwest Georgia. In particular, repeated sampling of baseflow along a 50-km reach at 1-km intervals and along three 3-km subreaches at 200-m intervals indicated focused groundwater discharge from the upper Floridan aquifer (based on end-member mixing and principal component analyses). There have been other hydrochemical studies of interactions between streams and the Floridan aquifer (e.g., Katz et al. (1997), cited in this manuscript). However, I am unaware of similar studies in the Lower Flint River Basin, which has undergone intensive groundwater pumping for irrigation. The methodological approach is reasonable. The authors relate their findings to streamflow and hydraulic-head data and explain the implications for resource management. The manuscript is well-organized and generally well-written, and the illustrations and tables are appropriate. My corrections and clarifications below are relatively minor.

l. 110: What was the amount and seasonal variability of rainfall during the study? The authors note there was exceptional drought during 2009-10 (l. 164-165). There is a weather station at the Jones Ecological Research Center.

l. 111: For consistency, "Geohydrology" should be "Hydrogeology".

l. 115-116: The Floridan aquifer does not underlie Mississippi or all of Florida (the western Panhandle is excluded).

l. 121: "updip and pinch out" should be "pinch out updip".

l. 139: At what times of year were rainfall samples collected?

l. 152, 160: Were field parameters (e.g., pH, temperature, and specific conductance) monitored during groundwater sampling to ensure that the wells were adequately purged?

l. 176: Was the Hydrolab calibrated before use?

l. 208: "Chistopherson" should be "Christopherson".

l. 210: "matix" should be "matrix".

l. 238: "cabonate" should be "carbonate".

l. 238-244: The comments about rainout effects, evaporative enrichment and depletion apply to oxygen-18 as well as deuterium.

l. 249, 252, 254 (eq. 2 and 3): "VSMOV" should be "VSMOW".

l. 271-272: The statement "using gas chromatography (GC) values to measure stable krypton gas in water" seems incorrect. I assume oxygen-18 and deuterium were measured on water vapor using a stable isotope-ratio mass spectrometer.

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2214-5818/$ – see front matter
http://dx.doi.org/10.1016/j.ejrh.2016.01.021

l. 287: “Nitrates” should be “nitrate” (also l. 289, 348, 350, 441).

l. 316, 319: 18 in “δ18O” should be a superscript.

l. 346: “stables” should be “stable”.

l. 352: I assume “r2 □ 0.01” should be “r2 = 0.01”.

l. 391: “decreased head (pressure) on the UFA” should be “decreased hydraulic head in the UFA”. Are there well hydrographs to corroborate this inference? I assume so, since l. 407-410 refer to USGS NWIS data.

l. 392: “Stepwise increases in groundwater within these reaches” should be “Stepwise increases in groundwater inputs along these reaches”.

l. 437-438: If a storm occurred during LR1 sampling, the samples were not all collected under baseflow conditions, as stated on l. 171.

l. 449-470: I agree that baseflow along Chickasawhatchee Creek was dominated by groundwater discharge. However, it’s inaccurate to state that “Increases in specific conductance immediately below the Chickasawhatchee confluence accounted for 9-24% of total groundwater inputs” (l. 450-451). The authors note that wetland flows may have affected Chickasawhatchee water chemistry as well.

l. 452: “Upward hydrologic gradients (aquifer updip)” should be “Upward hydraulic gradients from the aquifer”.

l. 488: What is the “large drain”?

l. 503: “visual flow” should be “visible flow”.

l. 510-511: “net primary production vary continuously as basin area and flow increases” should be “net primary production varies continuously as basin area and flow increase”.

l. 512: “such as flow. . ., geology and topography, introduce” should be “such as flow. . ., geology and topography introduce”.

l. 587-589: For Bredehoeft et al. (1982), I think “Cooper, J., H.H.” is incorrect.

l. 592: For Brook and Allison (1983), “Cincinnatti” should be “Cincinnati”.

l. 623-625: For Gonfiantini et al. (1998), “Fr□hlich” should be “Frohlich”.

l. 626-629: For Grossman et al. (1998), I think “Robert E.” should be “Robert, E.”

l. 647-649: For Katz et al. (1997), “istotopic” should be “isotopic”.

l. 679-680: For Montgomery (1999), “River Contiuum” should be “river continuum”.

l. 689-691: For Peterson et al. (2011), “Rhett Jackson, C.” should be “Jackson, C.R.”

Table 1 Are there no data on pH and specific conductance of precipitation, or on temperature, pH, and specific conductance of groundwater?

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